Winter Gift in the Glass

Mira Ananicz, Vincor, Canada

Mira was born and educated in Poland in the field of Analytical Chemistry and Chemical Technology. After completing 2 years at the University in Wroclaw -Poland in the Dep of Chemical and Mechanical engineering, she came to St . Catharines to visit her cousin. Taken in with the beauty of St. Catharines in the heart of Ontario wine region, she decided to continue her studies at Brock University . Mira graduated with Bachelor of Science in Chemistry in 1973.

Dedicated to the pursuit of wine making she completed additional courses at Davis University in California . Mira is currently working at Vincor International in the capacity of Chief Oenologist, and recently celebrated 32 years as wine maker-Canada's longest serving female winemaker, and the first female winemaker in Eastern Canada.

Mira is a member of American Society of Oenology and Viticulture Royal Canadian Legion, Br 418, and International Torch Club. Her hobby is golfing ,skiing and woodworking.

In just over a decade, the Canadian wine industry has grown from primarily producing lower priced wine, and selling it in a protected domestic market to becoming a competitive participant in the international market for premium new world wine (wine produced in Canada, USA, Australia, south Africa and south America) . The regions of Europe such as France, Germany, Italy and Spain are considered 'Old World"

Canadian Wine Facts:

1. Canadian wine making is not a recent phenomenon. Viking explorer Leif Ericson first named Canada, Vineland in 1001 BCE after he found so many vines growing where he landed at L'an Aux Meadows Newfoundland
   In 1535 Jacque Cartier also found many grapes growing on the island he named Ile de Bacchus (known now as ile D'Orleons)

2. Johanne Schillar, a retired German soldier is known as the father of Canadian wine industry. In 1811 he applied his expertise from Rhine wine making ,to a 400 acres of grapes planted in the Niagara region of Ontario, mainly near Grimsby

3. The first commercial winery was VinVilla on Pelee island in 1866.

4. In 1890 there were 41 wineries in Canada, 23 of those were in the corridor between Windsor and Peelee Island.

5. Today we have wineries in Ontario, BC, Quebec, Nova Scotia and Prince Edward island.

6. By 1919 all provinces went dry under Prohibition (except Quebec). Canadian law made it illegal to sell ,but not to manufacture.

7. At the end of prohibition each provincial government decided to regulate the sale of alcohol. The government monopoly in Ontario is the world's largest single purchaser of wine in the world, buying 8.5 million cases annually (or 76.2 million litres)

8. In 1955 Brights Winery produced the first 100% Canadian Chardonnay

9. In the early 1970 Canadian preferred sweet ‘pop wines’ . 7% alcohol products such as baby Duck .

10. In addition to the classical vinifera grapes varieties(Chardonnay, Cabernet Sauvignon), Canada grows several hybrids such as Baco Noir, Marchal Foch and Vidal.

11. Ontario’s premier wine regions include Niagara peninsula, Lake Erie North shore and Pelee island.

12. British Columbia is the second largest grape growing region including the Okanagan valley, Similkanmeen Valley, Frasar Valley and Vancouver island.

13. Canada’s wine regions are on the same latitude as Burgundy in France, The Chianti region of Italy and the Rioja region of Spain.

14. In 1988 the Vintners Quality Alliance (VQA) was created to ensure a minimum quality standard in the industry.

VQA has two categories: provincial and geographic:

- The provincial designation allows hybrids or vinifera grapes with 75% minimum of the name of the grape variety.
- Geographic designation refers to specific viticulture area, which will be named on the label. Only Vinifera grapes can be used with 85% minimum of the named variety. Vintage dated wines must have a minimum of 85% of the wine from that vintage.

Greatest success story in the Canadian wine industry:

Ice Wine originated by fluke in 18th century Germany, when a snap freeze caused growers to harvest frozen grapes. Now Ice Wine is made in Germany, Austria Canada and some states in the USA (Ohio, NY).

In Canada, Ontario is the biggest producer of ice wine. In Ontario and Germany ice wine is defined as “ naturally frozen”.

Walter Hainle made the first Ice Wine in Canada in 1973, and the first commercially available Canadian Ice Wine was made by Hainle Vineyards (Okanagan Valley) in 1978.

In order to make Ice Wine, the grapes are left on the vine until after the first frost hits.
These grapes are harvested after being frozen in the vineyard and then while still frozen they are pressed.

Since the grapes are left on the vine well into the winter months, the resulting freezing and thawing of the grapes dehydrates the fruit, and concentrates the sugars, acids, and extracts in the berries, thereby intensifying the flavors and adding complexity to the wine made from it.

The juice from Ice Wine grapes is about one-fifth the amount you would normally get if you pressed unfrozen grapes. To put it another way, a vine will normally produce sufficient grapes to make a bottle of wine; but frozen grapes would produce only one glass of Ice wine

Typical grapes used for ice wine production are: Riesling, Gewürztraminer, Vidal Blanc, and, interestingly, the red grape Cabernet Franc. Cabernet Franc ice wine is a light pink color, like most rosé wines.

During both of those processes: grape picking and pressing, the temperature cannot exceed -8 degrees Celsius (Table 1.)

Table 1:

Temp	Sugar Content
-6	29%
-7	33%
-8	36%
-9	39%
-10	43%
-11	46%
-12	49%
-13	52%
-14	56%

Ideally the temperature should get to between -10 and -13 degrees Celsius before picking. This provides the optimum level of sugar and flavor in the grapes.
The lower the temperature the higher the sugar content in the grapes, but also a lower yield of juice per tone of grapes.

Ice Wine in Canada is produced under the strict rules and regulations set out by the VQA Vintners Quality Alliance.

This includes the following:

1. The finished must (which is the juice, pulp and seeds), must have a Brix level of 35% or higher (Brix is the sugar level).
2. The alcohol must be derived exclusively from the natural sugars of the grapes. All wines that are labeled as ice wine must be produced by VQA registered growers and winemakers.
3. The harvest of ice wine grapes must start after November 15th.
4. Before harvesting the producer must verify in writing (by specified form) the following:
   a) the temperature of each individual harvest
   b) the acreage and tonnage of each given crop
   c) the measured Brix level of each must.
   d) the harvesting date and time of day
   e) Ice Wine processing capacity.
5. All VQA ice wine processors are required to attend a VQA ice wine standards seminar each year.
6. VQA authorities randomly sample and analyze must, juice and wine to ensure the standards are being met.

Table 2: Total Grape Purchased in (T) for the last 5 years in Ontario

	2001	**2002**	**2003**	**2004**	**2005**
Red Hybrids	4775	4224	4229	5828	3275
White Hybrids	14699	13500	12121	16235	6857
White Vinifera	12602	13197	4954	11812	4304
Red Vinifera	9867	13371	5146	12304	3810
Total	**41943**	**44292**	**26450**	**46179**	**18246**

- 2003 and 2005 were very poor Vintages due to winter and spring injuries

Table 3: Ice wine Juice (L) production in Ontario from 2000 till 2004

	2000		**2001**		**2002**		**2003**		**2004**	
	L	**T**	**L**	**T**	**L**	**T**	**L**	**T**	**L**	**T**
White Hybrids	261000	1740	307199	2048	401772	2678	371578	2478	688966	4594
White Vinifera	56437	376	32573	217	140544	937	46230	308	112624	751
Red Vinifera	11242	75	22891	153	82816	552	19863	132	98580	657
Total	328679	2191	362664	2418	625132	4167	737671	2918	900170	6002

*T - Tonnage for ice wine grapes was calculated based on 150L recovery/t of grapes at maturity
*2005 data is not available

Table 4: Some examples of 2005 vintage Ice Wine juices analysis:

	Cabernet Franc	Riesling	Vidal
Brix	40-42	38-39	36.5- 44
TA g/L	8.2- 8.4	9- 9.2	9.0- 10.7
pH	3.4- 3.49	3.08- 3.10	3.28- 3.77
VA g/L	0.15- 0.18	0.06- 0.1	0.06- 0.15

Before we start fermentation of the Ice Wine juice, we must prepare juice in such a way, that after the fermentation is completed, and the ice wine is produced, there is a minimum of adjustment, alteration performed on the finished product.

Any recommended changes as to tannins, astringency, colour, protein stability, total acidity, pH – should be done prior fermentation.

It is recommended addition of approximately 50 ppm of total SO_2 into the juice.
The bisulphate ion binds to aldehydes and ketons preventing oxidation.
SO_2 is protecting highly concentrated juice from microbial spoilage and browning.

The highly concentrated grape must presents a major hurdle for wine yeasts which have to ferment the juice. The ice wine industry all over the world has problems with controlling production of volatile acids in the ice wine by the yeast cells.

Certain strains of wine yeast are more sensitive to osmotic stress from the high concentration of sugars than the others. More stress - means more volatile acids.

Human sensory threshold for volatile acidity is between 0.7 to 1.2 g/L. The challenge for Ice Wine-makers is to keep VA reaching detectable levels. The Canada Food and Drug Act specifies that V.A. in wine cannot exceed 1.3 g/L and for ice wine it is up to 2.1 g/L
Winemakers expecting yeasts to ferment juice with high sugar content of 35 – 45 Brix, high total acidity, high SO_2, so they must do their outmost to provide all the nutrients the wine yeast needs.

The major growth factor for yeast cells is Nitrogen -Yeast Assimilable Nitrogen Cont. (YANC) and target level for healthy fermentation varies by grape sugar content and grape maturity level.

For Brix of 21 YANC level is 200 mg N/L, where at 27 Brix YANC level is 350 mg N/L Low levels of YANC have been associated with the production of unwanted sulfide compounds as well as sluggish fermentation.

YANC is composed of to two elements
1. organic – amino nitrogen
2. inorganic – Nitrogen (ammonia)

To optimize the nitrogen uptake during fermentation of ice wine juice, yeast rehydration nutrient GO-FERM is recommended in the range of 0.3 to 0.4 kg/1000L of juice. The yeast soaks up the valuable bio-available micronutrients as they re-hydrate .
Infusing yeast with these essential nutrients prepare them against alcohol toxicity.
Preparation of yeast starter as well as juice itself before fermentation is very important.

Recommended amount of selected active dry yeast of 0.3 to 0.4 Kg/1000L should be added into yeast rehydration nutrient solution at the temp of 40C and let it stand for 15-25 minute stirring gently a few times during that process.

Recommended yeast for ice wine production:

DV10 S.Serevisiae.bayanus:
This strains fermentation kinetics are strong over the wide temperature range, and has relatively low Nitrogen demand. Has an ability to ferment in low pH, high total SO_2 and low temperatures. Produces low VA and low H2S

R2 S.ceravisiae.bayanus :
This strain was isolated in the Sauternes region of Bordeaux. It has excellent cold temperature properties, and can ferment as low as at 10 C.
If it does not get proper nutrition, it tends to produce VA. R2 helps create intense, direct fruit style wines.

K1-V1116-S.serevisiae.cerevisiae:
This strain can ferment high concentration of sugars at low temperatures. However, it requires proper nutrition. It is a strong floral ester producer. K1 ferments well under stressed conditions.

6-8 hours after inoculation it is recommended to add yeast nutrients such as Fermaid-K or D.A.P. (Diammonium phosphate) into the fermenting juice in the rate of 0.2-0.3kg/1000L.
Yeast cells do not metabolize alpha amino acids equally.
The timing of nutrient addition is important. One large addition of D.A.P. at the beginning of the fermentation may delay the uptake of alpha amino acids.
If needed for YANC supplementations it is recommended to add multiple additions of nutrients.

Length of fermentation of ice wine juice depends on

- Yeast strain and yeast nutrients requirement
- Inoculation rate
- SO_2 level
- Sugar concentration
- Desired alcohol level
- Temperature of fermentation

Although the inoculations rate has no impact on lowering the acidic acid or glycerol concentration in wine, fermentation at lower inoculation rate consumes less sugar -therefore yeast cells convert higher proportion of sugar consumes to acidic acid and glycerol in comparison to yeast cells at higher inoculation rate.

Methods to reduce stress on the fermenting yeast, therefore reducing concentrations of unwanted yeast metabolites, reduction of time required to ferment juice to a desirable alcohol level is the key to the quality of the finished product and its success in the marketplace.

It is by no accident that Ontario's ice wine is among the best in the world. Our summers ensure high sugars in the grapes and our winters ensure a Ice Wine harvest. This combined with the standards set by the industry leave Ontario's ice wine difficult to surpass.

Canada today is the largest producer of this rare, rich and sweet ambrosia, with the lion's share coming from Ontario's Niagara Peninsula. Volume of Ice wine produced in Ontario has risen phenomenally commensurate with demand. Sales in Vintages alone rose from 25,000 bottles in 1992-93 to a 120,000 bottles in 1996-97. Sales continue to grow at a rate of over 50% per annum.
The demand is also evident in the export market - particularly in the Far East where Ontario Ice wines have fetched over three times the domestic price in Japan.

Canada is exporting ice wine into 34 different countries, the biggest importers (2004 stats) are

Taiwan	32,309L
Singapor	6,909L
USA	22,252L
Japan	14,247L
Hong Kong	4,998L
South Korea	7,729L
China	9,164L
UK	1,424L
Malaysia	2,159L

For over 20 Years European banned Canadian Ice Wine from their Markets stating high sugar contents as their reason. The ban was lifted in May 2001.

In June 1991 Inniskillin Winery shocked the world when they won the coveted Grand Prix D'Honneur at Vinexpo (the Olympics for the wine world) in Bordeaux France for their 1989 Ice wine.
Inniskillin Ice wine is now the largest selling wine brand in the International duty free channel, beating out Mum's and Moet et Chandon Champagne.

Flight No._____ Sample No._____ Color_____

Fruit derived / varietal flavors: _____

Texture / Mouthfeel:_____

Overall / Balance / Structure:_____

Comments:_____

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